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Successful Transition to Home Following a Spinal Cord Injury: A Resource Guide for Home Modifications

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SUCCESSFUL TRANSITION TO HOME FOLLOWING A SPINAL CORD INJURY: A RESOURCE GUIDE FOR HOME MODIFICATIONS

by

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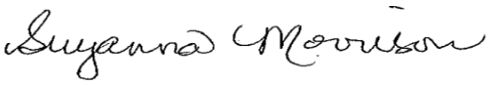
APPROVAL

This Scholarly Project Paper, submitted by Alison Ikeogu and Kelsey Kanwischer in partial fulfillment of the requirement for the Degree of Master of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.



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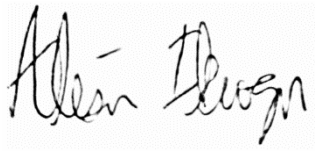

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TABLE OF CONTENTS

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- Alison Ikeogu, MOTS & Kelsey Kanwischer, MOTS

ABSTRACT

Purpose

Home modification is a unique area of practice that aims to increase independence of desired tasks by decreasing the physical limitations in and around the home (Aplin, Jonge, & Gustafsson, 2014). The process of modifying the home can be difficult, decreasing emotional well-being and satisfaction (Aplin, Jonge, & Gustafsson, 2014). Studies have identified the need for home modification services for individuals post Spinal Cord Injury. Silver, Ljungberg, Libin, & Groah (2012) found that injured persons were reintegrated into the community with limited knowledge regarding housing and accessibility options. The purpose of the product was to provide a tool for occupational therapists to deliver accurate, safe, and holistic recommendations and resources in order to ease the transition from rehab to home and assist in facilitating collaborative conversation with members of the home modification team.

Methodology

The authors conducted an extensive literature review in order to develop a greater understanding of the personal and environmental factors that contribute to an individual that has sustained an SCI. The information obtained from the review of literature was then analyzed using the Person Environment Occupation (PEO) model, an occupational therapy model analyzing the relationship between the person, environment, and the

occupations they complete (Turpin & Iwama, 2011). The areas of need were identified through the literature review, which found: a lack of a holistic approach when providing home modifications, infrequent use of an assessment/guide when making recommendations for a home, and the home not fitting the individual's standards

Results

Based on the methodology described above, the authors developed *Successful Transition to Home Following a Spinal Cord Injury: A Resource Guide for Home Modifications* for occupational therapists working with individuals who have sustained an SCI that require modifications to their home.

Conclusions

Limitations of the guide that the authors identified include: the product has not been tested in a clinical setting, effectiveness and practicality within a hospital or clinic have not been established, and it is not a comprehensive list of resources. Areas of strength that the authors identified include: the variety of resources, the holistic approach integrated throughout the guide, and the opportunity to collaborate with other professions. It is recommended that the guide be introduced to someone with an SCI, and outcome measures be implemented to determine effectiveness. The guide created will contribute to the profession of occupational therapy by providing working occupational therapists with a tool to enhance the home modification process.

CHAPTER I

INTRODUCTION

Individuals with a spinal cord injury (SCI) who are transitioning from hospital to home face issues such as decreased self-care and ADL productivity with a potential decrease in quality of life and morale (Barclay, Callaway, McDonald, Farnworth, Brown, & Broom, 2011). Silver, Ljungberg, Libin, and Groah (2012) found that the second most common barrier for individuals returning home after an SCI was lack of support in the home environment. Occupational therapy professionals play an important role in assisting individuals with an SCI transition successfully to home. The profession has improved quality of life and independence in meaningful occupations for individuals with an SCI by providing home modification recommendations (Allen, Resnik, & Roy, 2006; Aplin, de Jonge, & Gustafsson, 2015; Pettersson, Brandt, Lexell, & Iwarsson, 2015; Stark, Somerville, Keglovits, Smason, & Bigham, 2015).

Occupational therapy's role in home modifications has been shown to bring a client centered perspective that is seen as "valuable and important", which allows individuals with an SCI to successfully engage in activities of daily living (Pettersson, Lofqvist, & Fange, 2012). Additionally, home modifications have been shown to decrease unpaid help by 14%, thus decreasing caregiver burden and improving overall quality of life for the client and his or her support system (Aplin et al., 2015). Despite studies demonstrating the important role of occupational therapy in assessing and

modifying home environments to enable successful occupational performance, there is a significant lack of evidence-based occupational therapy assessments and tools for this population (Aplin et al., 2015; Stark et al., 2015). The lack of formal home modification assessments and resource guides contributes to the overall lack of resources and support individuals with an SCI experience as they begin transitioning from hospital to home (Pynoos & Nishita, 2003; Silver et al., 2012). It is vital that occupational therapists begin to bridge this gap in services by creating and utilizing formal home modification assessments and resource guides in order to provide the best care possible to this population and facilitate successful occupational performance and quality of life upon discharge from the hospital or rehabilitation facility.

The authors created a resource guide for occupational therapists to utilize to assess the needs for home modifications for individuals transitioning to home after an SCI. The resource guide will be organized by person, environment, and occupational factors as influenced by the occupational therapy model of Person Environment Occupation (PEO) in order to provide a comprehensive resource guide that is holistic in nature (Turpin & Iwama, 2011). The resource guide is intended for use in a hospital or rehabilitation setting in order to anticipate needs of individuals with an SCI and recommend home modifications to support independence and safety in daily living tasks.

The factors that will influence the application of the resource guide for individuals transitioning from hospital to home after an SCI are varied. The first factor that will influence the implementation of the guide is the distribution of the guide to hospitals and rehabilitation facilities. Once the resource guide is present in the facilities, whether or not therapy managers encourage therapists to utilize it is a crucial component of the guides

ultimate success and usefulness. As time is limited for occupational therapists in a hospital or rehabilitation setting, initiation of the resource guide for home modifications prior to discharge may prove difficult. In addition, occupational therapists working with this population may prefer informal interviewing and recommendations rather than utilizing a more formal guide.

The researchers have determined that the PEO model will be used to guide the intervention process as it aims to interpret the occupational performance of individuals in a holistic manner (Turpin & Iwama, 2011). It is important for the researchers to create the home modification guide by considering the person-environment-occupation fit as each component affects one other. This will in turn affect the quality and effectiveness of the home modification process. As individuals with an SCI return home from the hospital or rehabilitation facility, their needs must be met in order to continue progress. By analyzing the home environment in a holistic manner using a home modification resource guide, therapists can provide interventions and recommendations specific to the needs of the individual. Additionally, the therapist can attempt to maximize mobility and access to the home environment, ultimately improving client satisfaction and quality of life.

Key Terminology

Key terms and concepts the authors used to guide their research include the following:

- **Home modification/home modification protocol**: A process "aiming at removing physical environmental barriers in order to provide an independent life in the home" (Pettersson et al, 2012, p. 1706).

- **Spinal cord injury**: Damage to the spinal cord that can result in permanent motor and/or sensory loss (National Spinal Cord Injury Statistical Center [NSCISC], 2016; World Health Organization [WHO], 2013).
- **Occupational therapy**: "...the therapeutic use of everyday life activities (occupations) with individuals or groups for the purpose of enhancing or enabling participation in roles, habits, and routines in home, school, workplace, community, and other settings" (AOTA, 2014, p. S1).
- **Universal home design**: "...the built environment that enhance optimal function and convenience for everyone, regardless of ability" (Rigby & Craciunoiu, 2014, p. 308).
- **Wheelchair**: A "manually operated or power-driven device designed primarily for use by an individual with a mobility disability for the main purpose of indoor, or of both indoor and outdoor, locomotion" (ADA Requirements, 2014, p. 2).
- **Person environment occupation**: person - "individual, including family member, caregiver, teacher, employee, or relevant other" (AOTA, 2014, p. S44); environment - "external physical and social conditions that surround the client and in which the client's daily occupations occur" (AOTA, 2014, p. S40); occupation - "daily life activities in which people engage" (AOTA, 2014, p. S43).
- **Accessibility**: "...the encounter between a person, with his or her functional capacity, and the demands of the physical environment" (Pettersson et al., 2015, p. 2).
- **Inpatient rehabilitation**: This setting "provides an intensive rehabilitation program to inpatients" (USLegal, 2016, p. 1).

Databases used in the research process include the American Journal of Occupational Therapy, the British Journal of Occupational Therapy, the Canadian Journal of Occupational Therapy, CINAHL, PsycInfo, PubMed, and Clinical Key. The authors felt that these components would allow the greatest results for identifying what to include in the research process.

Subsequent chapters of the scholarly project include detailed descriptions of relevant information pertaining to the home modification resource guide. The second chapter includes a literature review that contains a general outline of information pertaining to the guide. The main sections describe the home modification process in general, including the occupational therapist's role. Additionally, a description of the spinal cord injury population and the need for successful home modifications is included. The third chapter provides a detailed description of what the home modification resource guide will look like, and how the researchers gathered information to create the guide. In the fourth chapter, the researchers describe the final product and present its importance for clinical use. This section includes a description of the product from beginning to end, and outlines the frame of reference used to conduct the creation of the guide. Finally, the researchers provide a summary that describes the purpose of the product, key information found throughout the process, limitations of the product, and recommendations for implementation of the product in future action.

CHAPTER II

LITERATURE REVIEW

Returning home after a significant health related event can be one of the motivating factors for ongoing recovery once discharged from a rehabilitation unit (Smith & Caddick, 2015). One major population that must consider the effects of their sudden disability in the transition home due to the complex requirements of successful independent living are individuals that sustain a spinal cord injury (van Loo, Post, Bloemen, & van Asbeck, 2010; Lysack, Komanecky, Kabel, Cross, & Neufeld, 2007; Smith & Caddick, 2015). Spinal cord injuries, which affect approximately 282,000 people in the United States today (17,000 new cases each year), can be defined as damage to the spinal cord that can result in permanent motor and/or sensory loss (NSCISC, 2016; WHO, 2013). Depression, decreased quality of life (QOL), and social and emotional challenges have shown to affect individuals with an SCI, which can be amplified when the environment to person fit is not appropriate (Smith & Caddick, 2015), possibly leading to a feeling of loss of control, a decrease in the user's ability to maintain life roles, and a reduction in the ability to continue to perform desired activities (Pettersson et al., 2012). Home modifications which aim to adapt physical barriers in the home to decrease dependence on others (Petersson, Kottorp, Bergstrom, & Lilja, 2009), may be a solution for individuals with an SCI to foster a successful transition to a desired living environment.

Individuals with an SCI often require a mobility device in order to explore their environment, manage their daily tasks, and experience a greater sense of independence. Lund, Nordlund, Nygard, Lexell, & Bernspang (2005) reported that 70% of the participants in their study with an SCI used a mobility device, demonstrating the overwhelming amount of mobility device users in this population. This can necessitate significant home modifications for functional use. It has been reported, however, that individuals who use a mobility device are not receiving adequate accommodations for their needs, resulting in a decrease of their perceived autonomy (Pettersson et al., 2015). Occupational therapists have the skills, training, and technique to provide home modification recommendations to improve overall function and participation in the home (Stark et al., 2015). Conversely, in an article by Russell (as cited in Aplin, de Jonge, & Gustafsson, 2015), it was reported that occupational therapists rarely use a standardized assessment tool, and may often perform the home evaluation informally. This may affect the homeowner's experience due to lack of structure and efficiency from the therapist. With the use of a developed resource guide, pertinent data would be gathered and utilized to inform holistic and appropriate recommendations.

The person-environment relationship, according to the occupational therapy model of Person Environment Occupation (PEO), describes a transactive process that works together to provide a method of understanding occupational performance (Turpin & Iwama, 2011). A transactive approach involves the dependency of one component affecting the other, meaning the person-environment-occupation fit cannot be examined separately, but instead as one cohesive element affecting the outcome of each other (Turpin & Iwama, 2011). This can provide greater understanding of the home

modification process when considering adaptations as the therapist can include all dimensions of the individual (person-environment-occupation). In an article by Iwarsson and Stahl (as cited in Pettersson et al., 2015; Helle, Iwarsson, & Brandt, 2014), it was concluded that accessibility in a home environment encompasses a proper person-environment relationship, and that in order to successfully examine environmental barriers, all components must be addressed. It is therefore appropriate to establish the principles of this occupation-based model when analyzing, recommending, and creating a home modification resource guide. During the discharge process, the therapist can assess the degree of fit for the person, the ability for the individual to complete their daily roles and make decisions, and come to a conclusion of the overall home environment (Rigby & Craciunoiu, 2014).

The PEO model will be used to guide the researchers' home modification resource guide by outlining the key components of the model. For example, in regard to the person, factors such as the individual's needs, roles, interests, habits, abilities, and values will be considered. The manual will also have a section relating to specific environmental factors, such as the type of establishment the individual will be living in, home layout, aesthetics, resources available, caregiver input, and socioeconomic factors. Finally, an opportunity for a description of the individual's occupational preferences will be included, such as areas of most difficulty, typical routine, and the activities the individual completes in their home environment. By considering the person, environment, and their occupations, the researchers believe that a comprehensive guide can be developed to help establish positive occupational performance. If the therapist can identify the barriers that affect participation, they can make recommendations for

modifications that support and ensure optimal independence and safety for those involved (Rigby & Craciunoiu, 2014). The purpose of this literature review is to highlight the need for a home modification resource guide in regard to the transition home post-SCI.

Home Modifications

Definition

In order to establish evidence based guidelines for home modifications for the SCI population, the term home modification must be understood and defined. In a study conducted by Pettersson et al. (2012), the authors defined home modifications as a community-based rehabilitation intervention "aiming at removing physical environmental barriers in order to provide an independent life in the home" (p. 1706). Environmental barriers associated with transitioning home after a spinal cord injury include entrances with high thresholds, stairs, small bathrooms, narrow doorways, narrow hallways, high countertops, and access to kitchen and bathroom cupboards (Allen et al., 2006; Pettersson et al., 2015). From an occupational therapy perspective, home modifications encompass any change in an individual's environment that increases function and independence in daily activities and occupations (Stark et al., 2015). For the purposes of this project, home modifications will include the use of assistive technology which is defined as any device that improves functioning in daily occupations (Pynoos & Nishita, 2003). Occupational therapists use a client-centered approach in which they analyze the personal factors of each client, such as age, gender, culture, socioeconomic status, and education level in order to implement home modifications that are effective and practical (Stark et al., 2015). For individuals with a recent spinal cord injury, occupational therapists must assess functional limitations and provide appropriate home modifications that will

decrease environmental demands and compensate for impairments (Aplin, de Jonge, & Gustafsson, 2013; Stark et al., 2015).

Types of Home Modifications

The types of home modifications recommended by occupational therapists vary based on personal factors, the severity of the spinal cord injury, and the use of mobility equipment (Allen et al., 2006). Home modification types include small remodel projects and full remodel projects. Some small remodeling projects are performed by the individuals and their families, however, Pynoos & Nishita (2003) found that many people have difficulty identifying and altering environmental barriers independently. Occupational therapists working with individuals who have suffered an SCI are an integral part of the transitioning process. Occupational therapists are trained to assess personal factors such as physical limitations and functional deficits and recommend appropriate home modifications (Pynoos & Nishita, 2003). The use of a wheelchair or a power mobility device is correlated with increased accessibility problems which creates the need for both small and large scale home modifications (Helle et al., 2014; Allen et al., 2006). Adaptive equipment is often recommended to support function in the home environment (Allen et al., 2006; Helle et al., 2014). Small remodeling projects involving adaptive equipment often include the installation of grab bars in various parts of the home to assist with safe transfers and to increase independence in activities of daily living (Allen et al., 2006; Helle et al., 2014). Larger remodeling projects for home modifications specific to wheelchair users include installing ramps, removing carpet and installing hard flooring, installing a lift system (elevator or a stair lift), widening doorways and hallways, lowering kitchen/bathroom counters and cupboards, installing an automatic door system,

installing transfer equipment, bathroom adaptations, relocating electrical switches to accessible locations and heights, and changing the overall layout of the home (Allen et al., 2006; Helle et al., 2014; Pettersson et al., 2015; Rudman, Hebert, & Reid, 2005).

Compliance with Home Modifications

The compliance of individuals with home modifications, both large and small is a factor crucial to the creation of an effective home modification resource guide. Rudman et al. (2005) found that individuals transitioning to home after an SCI were most likely to widen doorways and acquire ramps to assist with access to the home. In a different study, done by Allen et al. (2006), the authors reiterate similar findings, reporting that the most common types of home modifications for individuals with an SCI living in the community were bathroom modifications and the installation of ramps. On the other hand, it has been discovered that individuals were less likely to alter physical elements such as stairs, carpeted flooring, narrow doorways, limited space, and kitchen layout (Allen et al., 2006; Rudman et al., 2005). These findings are concerning because when there is a poor person-environment fit, the individual's ability to participate in meaningful occupations is significantly decreased (Allen et al., 2006). Large scale home modifications are often not performed due to the extensive cost often associated with assessment and installation (Pynoos & Nishita, 2003).

Funding

The cost of home modifications is a factor that clients, insurance companies, and occupational therapists must all consider. Clients who have recently suffered a spinal cord injury and are transitioning home often have limited knowledge of the medical, financial and insurance resources available to them (Pynoos & Nishita, 2003). Home

modifications are a medical service that is primarily paid for privately or out of pocket, which is why many individuals continue to live in homes that do not support function in daily activities (Pynoos & Nishita, 2003). Pynoos & Nishita (2003) found that 75% of individuals who are living in accessible homes paid for the modifications out of pocket. This is due in part to the fact that Medicare and Medicaid do not cover home modifications other than durable medical equipment (Pynoos & Nishita, 2003). Despite this, there are other options to consider when attempting to finance home modifications. According to Pynoos & Nishita (2003), home equity loans and reverse mortgages are two options often used to establish credit and allow for funds to be used to increase accessibility. Additionally, there are state programs available that provide loans to individuals and families with low to moderate incomes (Pynoos & Nishita, 2003). Those who are receiving Supplemental Social Security income have the option to use the Plan for Achieving Self-Support, which allows for a sum of money to be taken out and used towards the cost of home modifications without risking insurance benefits (Pynoos & Nishita, 2003). Finally, for individuals who are renting, there are laws in place that require landlords to provide "reasonable accommodations" in order to allow the individual to function in their environment (Pynoos & Nishita, 2003). The lack of insurance coverage for home modifications is a concern for the individuals with an SCI because the extent of home modifications required to support functioning is great (Pynoos & Nishita, 2003). Occupational therapists must consider the resource availability of each client in order to determine appropriate recommendations as well as provide knowledge of community resources to assist with funding (Stark et al., 2015).

Effectiveness of Home Modifications

The cost of tailored home modifications often varies; however, the effectiveness of these modifications has been demonstrated in recent studies. Pettersson et al. (2012) found that home modifications were seen as "valuable and important" because they enabled participants to more successfully engage in activities of daily living. This theme was echoed in a study done by Aplin et al. (2015), who found that modifications resulted in increased client perceptions of safety while performing various occupations. In the same study by Aplin et al. (2015), the participants reported increased participation in meaningful occupations after receiving home modifications. Allen et al. (2006) found that unpaid help (caregivers) was decreased by 14 percent with each home modification performed, which implies that an increase in independence for the client may also improve quality of life for caregivers. This finding is important to consider when discussing the effectiveness of home modifications because often, home modifications impact multiple individuals, not just the client. Home modifications have been found to be effective in increasing autonomy and client satisfaction with activities of daily living and meaningful occupations (Aplin et al., 2015; Pettersson et al., 2012).

Spinal Cord Injury Population

Barriers

Barriers among the SCI population will be inevitable due to the multitude of variables associated with the diagnosis. Issues such as self-care and ADL productivity, home maintenance participation, and work related activities are prevalent, with a potential decrease in quality of life and morale (Barclay et al., 2011). However, barriers associated with the home environment have been highlighted as a major limitation in

recent literature, which can lead to unnecessary hospital stays (New, 2015). In an article conducted by Silver et al. (2012) on the barriers for individuals with an SCI returning to the community post rehabilitation, it was found that the second most common barrier was lack of support in the home environment, including difficulty with addressing barriers in the home, locating independent living, and knowing where and how to find assistance for the home modification process. New (2015) also found that the third most common discharge barrier from a rehabilitation unit was home modifications. Home modifications were also listed as the number one reason for additional hospital stays (New, 2015). These findings highlight the importance and prevalence of home modification difficulties, especially when transitioning from a rehabilitation unit. Without advanced support provided, patients encounter major barriers associated with adaptations that need to be made to their home, which has the potential to decrease quality of life.

Personal attests of the experience in the process of home modification from individuals with a disability have been researched, with barriers highlighted as a major concern. In an article by Aplin et al. (2015), participants reported being dissatisfied with many of the modifications made, describing feeling like their home looked disabled. Other complaints, such as negative aesthetic decisions, unsafe modifications, poor consultation, unfinished projects, and having to self-finance projects are many concerns that have been reported (Aplin et al., 2015; Pettersson et al., 2012). Although these barriers may not have prevented the individual from returning home, they cause additional stress and unwanted burdens during a time of sudden disability.

An additional limitation that individuals with a spinal cord injury face includes transitioning to an environment that is inappropriate or lacks the proper modifications

needed to independently participate in daily cares. Silver et al. (2012) found that 27% of the SCI population under study transitioned to a nursing home facility after rehabilitation due to lack of support and education in obtaining proper housing accommodations. It is also reported that 20% of people with an SCI in the United Kingdom transition to an older adult facility (Smith & Caddick, 2015). Given that the average age of new SCI individuals in the United States (men and women combined) is forty-two years old (NSCISC, 2016), it is inappropriate and unjust that there is not a greater urgency for an efficient transition to a more suitable living situation. The impact of residing in an older adult care home on the health and wellbeing of people with an SCI can be detrimental. Smith and Caddick (2015) reported that participants in their study described how they felt as if their independence, psychosocial wellbeing, and ability to participate in the community or maintain meaningful relationships were negatively impacted due to the restrictions and disconnectedness they underwent in that setting. It can be difficult for younger individuals to relate to others in a nursing home environment due to the age gap, with most people reporting being unhappy and wanting to move out (Silver et al., 2012). Physical health may also be negatively affected, such as an increase in pressure sores, infections, and fractured bones due to the lack of training in SCI care that is provided for staff in a nursing home setting (Smith & Caddick, 2015). There is evidence that living at home can present similar complications. For example, van Loo et al. (2010) describes an increase in pressure sores, bowel regulation, pain, and edema for people with an SCI. This evidence is comparable to the previous article in that the participants were not receiving proper support, care, or education in managing their condition or seeking further accommodations.

Mental Health

Due to the sudden impact of the diagnosis of spinal cord injury, individuals may suffer from additional psychological effects. In a study by Migliorini, Tonge, and Taleporos, (2008) that examined the prevalence of mental health conditions in a group of SCI individuals, approximately half of the participants suffered from a mental health issue, including depression and anxiety. Although this article did not specify the reasoning for these results, others have determined that factors such as accepting that the injury occurred, learning how to live in a new body, and the environment in which the individual resides in can affect quality of life and wellbeing (Silver et al., 2012; Smith & Caddick, 2015). Living in an environment that does not feel comfortable and does not facilitate continued recovery can damage the psychological wellbeing of those involved (Smith & Caddick, 2015). Home modifications alone may not be able to improve an individual's quality of life, but when implemented in appropriate circumstances, an improvement in perceived participation may be possible.

Mobility Device

In addition to the barriers that have been examined, wheelchairs are a major device used by a large percentage of people with a spinal cord injury (Lund et al., 2005), which has the potential to alter participation of daily activities in the home if proper modifications are not made. Without adaptations, consequences such as unsafe compensation techniques, increased need for human assistance, and decrease in autonomy may develop (Allen et al., 2006; Helle et al., 2014; Pettersson et al., 2015). It is possible that the wheelchair user may not even recognize compensation techniques they are using due to lack of understanding or learning to alter their movements over time

(Helle et al., 2014). As was stated in previous sections, individuals that use a wheelchair have identified numerous common alterations that need to be made within the home. The great number of modifications made can be attributed to the inaccessibility of homes in general. It has been established that accessibility standards often are not adequate for mobility device users, and that the overall validity of the standards requires a possible revision in order to meet the demands these individual's need (Helle et al., 2014; Pettersson et al., 2015; Pettersson, Iwarsson, Brandt, Norin, & Lexell, 2014). Environmental barriers continue to be an issue for individuals using a wheelchair, however with proper home modifications that exceed the standards already in place, a wheelchair user can functionally participate in their everyday tasks (Allen et al., 2006).

Professional Impact

Occupational Therapy

The role of occupational therapy in the home modification process can be validated through personal experiences. Individuals with disabilities have reported that occupational therapists were beneficial to the home modification team as they brought relevant medical experience and knowledge of disability issues relating to housing concerns (Grisbrooke & Scott, 2009). They also believed that their occupational therapist brought a client centered perspective to the team, and that the OT provided empathetic support during the home modification process (Grisbrooke & Scott, 2009; Pettersson et al., 2012).

Although the role of occupational therapy in adapting environments remains clear, there is evidence that individuals receiving home modifications continue to have difficulties with feeling in control and having the ability to personalize their home when

working with their occupational therapist. It has been illustrated that occupational therapists provide recommendations based off experience and factor in the most cost efficient route (Pettersson et al., 2012). Although this may seem like a reasonable decision, many feel that client perspective and collaboration efforts have been lost, resulting in home designs and alterations that the user is not satisfied with (Aplin et al., 2015; Pettersson et al., 2014). It is important that occupational therapists continue to recognize the impact they have on the home modification experience, and to encourage their clients to have a choice in the design and products that will be added to their home (Aplin et al., 2013).

Multidisciplinary

In addition to the contribution that occupational therapists provide in home modifications, other professionals are involved in the overall care of people with an SCI. This may include home health nurses, physical therapists, social workers, psychologists, architects, contractors, and private builders (Aplin et al., 2015; Helle et al., 2014; van Loo et al., 2010). Although all disciplines listed may not be directly involved in the home modification process, in order to establish a positive experience for the user, Grisbrooke and Scott (2009) reported that professionals must learn to engage and embrace the different cultures of each discipline involved. It has also been reported that professionals must change their mindset and learn new "housing" jargon in order to transfer the language to be understandable by all involved (Grisbrooke & Scott, 2009). A multidisciplinary approach, in where team members are cohesive in their plan of care, has the potential to generate increased positive outcomes for individuals with a spinal cord injury and their transition home.

Conclusion

Home modifications have been shown to improve the quality of life and participation in meaningful occupations of individuals with an SCI (Allen et al., 2006; Aplin et al., 2015; Pettersson et al., 2012). The transition from hospital to home for individuals with a recent SCI is filled with barriers (New, 2015; Silver et al., 2012). As hospital stays shorten, it has become clear that there is a significant lack of services available to individuals after discharge to assist with housing, medical equipment, and home modifications that support function (New, 2015; Silver et al., 2012). The changes in physical capabilities that occur with an SCI directly affect how an individual is able to function within his or her environment (New, 2015; Silver et al., 2012). Home modifications, which are any changes in the environment that improve function in activities of daily living, have been shown to be effective in improving quality of life, decreasing caregiver burden, and improving function in ADL tasks and other meaningful occupations (Allen et al., 2006; Aplin et al., 2015; Pettersson et al., 2012; Pettersson et al., 2015).

While home modifications are effective, they have been found to be even more so when provided by occupational therapists (Grisbrooke & Scott, 2009; Pynoos & Nishita, 2003; Stark et al., 2015). This is due to occupational therapists' focus on tailoring the home modifications to each client based on the transaction between the following factors: person, environment, and occupation (Helle et al., 2014; Pettersson et al., 2015; Stark et al., 2015). A transactive approach involves the dependency of one component affecting the other, meaning the person-environment-occupation fit cannot be examined separately, but instead as one cohesive element affecting the outcome of each other (Turpin &

Iwama, 2011). The interaction between person and occupation is assessed first to evaluate individual occupational performance and functional deficits. Next, the interaction between person and environment is assessed to identify how each individual client experiences their home environment. Finally, the occupation environment interaction is evaluated to identify how the home environment influences performance of daily occupations.

Occupational therapists are uniquely qualified to assist individuals who have sustained an SCI to successfully transition from hospital to home; however, there is a significant lack of standardized assessments and guidelines, which decreases occupational therapy's credibility and consistency in this area (Aplin et al., 2015; Stark et al., 2015). Due to the current lack of support for individuals with an SCI after discharge from the hospital and the lack of occupational therapy tools for home modification, an occupational therapy resource guide specifically created to assess the home modification needs of individuals transitioning after an SCI is needed (Aplin et al., 2015; Stark et al., 2015). The resource guide will provide occupational therapists with a tool to utilize to assess personal, environmental, and occupational factors for each client prior to discharge to home in order to anticipate needs and recommend home modifications to support independence, safety, and meaning in daily living tasks.

CHAPTER III

METHODOLOGY

Developing a home modification guide for individuals with a spinal cord injury required the authors to research the deficits, areas of greatest need, and general information regarding the home modification process. We discovered that although there are home modification guides factoring in patient's needs, limitations, and falls risk (i.e. The Housing Enabler, Home Falls and Accidents Screening Tool, The Safe Living Guide) (Rigby & Craciunoiu, 2014) there is not a specific guide to assist occupational therapists and their clients with modifying the home after a rehabilitation stay for individuals with a recent spinal cord injury. Therefore, the authors sought justification for creating a product that can assist therapists in providing straightforward, holistic, and accurate recommendations. This chapter will have detailed descriptions of the rationale for creating the guide, an overview of how the product will look, and what the authors researched to begin the development of the guide.

Justification of the Product

During the literature review process, the authors had difficulty locating evidence that discussed the use of a home modification guide relating to spinal cord injuries. In addition, the literature highly emphasized the lack of a holistic approach when providing home modification recommendations. In an article by Pettersson et al., (2012), the authors found that the occupational therapists made home modification recommendations based on their experiences. Although experience is a key factor for providing

knowledgeable information in any situation, it should not be the sole means for gathering information as the therapist could be inadvertently recommending ineffective, misguided, or even harmful modifications. Additionally, it has also been reported that occupational therapists infrequently use assessments when making recommendations for a home, and often times, perform the evaluation informally (Aplin et al., 2015). With the development of a home modification resource guide, therapists can avoid solely relying on their experiences: especially those who have limited experience in this specialty of occupational therapy.

Another concerning finding that the researchers discovered from the literature is an issue revolving around discharge barriers for individuals who have sustained a spinal cord injury. Discharge barriers can have detrimental effects on the hospital/clinic and the patient, whether they are time, money, or resources. Silver et al., (2012) reported that the second most common discharge barrier for individuals in an inpatient rehabilitation unit who have the diagnosis of SCI were housing difficulties, which included how the home modification process works, which modifications needed to be made, and how to locate the necessary resources. Similar results were found in an article by New (2015), with the most common discharge barrier being home modifications. In addition, home modifications were listed as the number one reason for additional hospital stays for the population under study (New, 2015). Occupational therapists are uniquely trained with skills that allow them to holistically examine the patient's situation, home environment, and needs to recommend appropriate modifications that facilitate the greatest client fit (Stark et al., 2015).

Other complications have been uncovered with the lack of an established home modification resource guide for the SCI population. Aesthetic design is a component that therapists commonly disregard (Aplin et al., 2015). It has been reported that often, the home does not fit the individual's standards, and that his or her home looks disabled (Aplin et al., 2015). Further difficulties that individuals receiving home modification recommendations from therapist's face include unsafe modifications, unfinished projects, and poor consultation (Aplin et al., 2015; Pettersson et al., 2012). With the creation of a home modification resource guide, it is the authors hope to provide a tool for occupational therapists to provide accurate, safe, and holistic recommendations in order to ease the transition from rehab to home and assist in facilitating collaborative conversation with other members of the home modification team.

Product Overview

PEO Layout

To create the home modification guide, the authors used properties from the Person Environment Occupation Model (PEO) in order to ensure a holistic approach. Sections in the guide reflect this model, addressing components of the person, environment, and occupation.

Person

Turpin and Iwama (2011) discuss how people (person) change over time in relation to the environments around them, including their attributes, abilities, and skills. Additionally, Turpin and Iwama (2011) examines how individuals can view themselves, realizing what they are now or no longer capable of doing in their environment. In this section of the guide, the authors provide an opportunity to gather personal information

through an objective and subjective method (i.e. self-report and clinic judgement). This consists of personal open ended questions with an area for additional comments. Including both methods will ensure that the therapist can contribute their professional observations and the individual can provide personal experiences (Turpin & Iwama, 2011). Information the authors are looking for from this section includes the individual's needs, roles, interests, habits, abilities, values, and any information regarding their personal experiences. It will be important to gather key information that can assist a therapist to know how the person interacts with his or her modified environment post SCI.

Environment

The next main section, environment, takes on a broad definition of the term, including the physical, social, cultural, socioeconomic, and institutional environment (Turpin & Iwama, 2011). It is important to note that this model emphasizes the transactive process that occurs between the person, environment, and occupation. For example, the physical environment can influence what activities an individual will engage in. Those activities can influence the individual's perceived worth, and whether they will continue to engage in the activity or not. Due to this transactive process, environmental components are addressed in the "Person" section as well. For this section, the authors are looking to provide information, resources, and guidelines related to the home and the home modification process. This includes the home layout, aesthetics, preferences on materials, resources available, and socioeconomic factors. The social and cultural factors related to the PEO model are highlighted in the "Person" section. Additionally, the authors include an opportunity to provide recommendations for

other team members, explore assistive technology options, and have developed a follow up form to gather information post discharge regarding the individual's experience of the home modification process.

Occupation

The authors' original plan for this section was to provide information specifically on the occupations that individuals participate in their environment. This included the specific activities and daily tasks completed in the home. However, after creating the "Person" and "Environment" sections, it was determined that the concepts of occupation and occupational performance were highlighted and enmeshed throughout. This was looked at to be a concern, however, the authors realized that because PEO is a transactive process, it is difficult to separate the concepts into concrete categories. The information presented in this section includes a detailed description of how the transactive process of PEO can be seen throughout the guide, which in turn affects occupational performance.

Resource Layout

Originally, the authors' plan was to create a resource section in which all resources relevant to the home modification process for individuals with an SCI were included. As the resource guide evolved and the PEO assessment components were explored further, the resources were included within two separate areas: the environment section and in the final resource section. Resources were included within the environment section as they are most relevant to the environmental context and environmental barriers present. Resources included in the environment section include resources related to the following topics: assistive technology, aesthetics, funding, and laws and regulations. The authors are including housing accessibility standards and a handout reviewing the fair

housing act in order to provide education and resource material for individuals with an SCI discharging from the hospital to a rental or commercial property. Items explored in the final resource section of the guide include a description of resources found on the United Spinal Association's website, relevant research articles, consumer guides to home modifications, and online blogs related to SCIs. Both sections provide occupational therapists with accurate and reliable information with which to provide safe recommendations and evidence-based guidelines for the home modification process. The home modification resources included in the guide are being chosen based on the most prevalent challenges faced by individuals with an SCI returning home from the hospital. Prevalent challenges faced, as revealed by the research and literature review, include the following: difficulty appropriately addressing environmental barriers in the home, difficulty locating independent and accessible housing, lack of aesthetically pleasing home modification options, lack of knowledge regarding financial resources available for home modifications, and a lack of knowledge and support for how to find assistance for the home modification process (Barclay et al., 2011; New, 2015; Silver et al., 2012). The resource portion of the guide is intended for occupational therapist's to use in order to facilitate reliable, accurate, and safe home modification recommendations and relevant resources.

Information Gathered

To create the guide, information specific to the PEO model was gathered from research articles and textbooks in order to establish a comprehensive understanding of the model. Home assessments such as the Safe at Home Checklist created by the American Occupational Therapy Association were used to ensure a thorough evaluation of all

important factors to be included in the guide. To address specific environmental factors and inform the resource section of the guide, the authors utilized information from the Americans with Disabilities Act which includes standards for accessible design and provides detailed information regarding current laws and regulations. Information regarding current fair housing laws has allowed the authors to incorporate such details into the resource guide in order to assist patients with navigating home modifications while living in a rental property or other commercial properties such as assisted living facilities. Applicable research and resources from rehabilitation clinics, therapists who specialize in the area of spinal cord injuries and/or home health, corporations providing accessible products and services, and consumer blogs are utilized in the home modification section of the guide to provide a comprehensive list of home modifications, services, and products. Information included from the United Spinal Association's resource center includes details regarding resources to pay for home modifications, accessible home designs, research articles for home modifications for individuals with an SCI, and additional housing modification resources. To create this resource guide, the authors utilized current ADA standards and regulations, applicable research articles and resources, consumer blogs, consumer guides to home modifications, and home modification information from rehabilitation clinics, home health agencies, and national corporations providing accessible products and services.

CHAPTER IV

PRODUCT

An extensive literature review was conducted in order to develop a greater understanding of the personal and environmental factors that contribute to an individual that has sustained an SCI. The information obtained from the review of literature was then analyzed using the Person Environment Occupation model, an occupational therapy model focusing on the relationship between the person, environment, and the occupations they complete (Turpin & Iwama, 2011). The areas of need were identified through the literature review, which found: a lack of a holistic approach when providing home modifications, infrequent use of an assessment/guide when making recommendations for a home, and the home not fitting the individual's standards. Based on the findings from the literature review, the authors created *Successful Transition to Home Following a Spinal Cord Injury: A Resource Guide for Home Modifications* for occupational therapists working in an inpatient rehabilitation center.

In conjunction with information from the individual's medical record (i.e. DOB, diagnosis, insurance type, etc.), the guide is a method to gather information regarding meaning of the home. The occupational therapy model of Person Environment Occupation is used to frame the guide, with specific sections for each area of the model. The authors believe that by examining the home modification process through this model, it will in turn facilitate a holistic approach when analyzing the home as the therapist will

be encouraged to address all areas of the individual being assessed. The guide is comprised of four main sections: Person, Environment, Occupation, and Resources. The person section is a set of semi-structured interview questions for the occupational therapist to administer during a therapy session. The therapist is looking to gather information on the individual's needs, roles, interests, habits, abilities, values, and any information regarding their personal experiences. The environment section encompasses information, resources, and guidelines for the therapist to utilize in order to provide holistic recommendations when examining the environment from the individual's perspective. A follow up form has been created in order for the therapist to inquire how the home modification process is going, and whether changes in the process need to be made. Additionally, the authors felt as if it was important to have a method to increase communication between therapist and contractor, which is why a form has been created for that purpose. Finally, general information is provided regarding layout of the home, resources for individuals to use when in the process of designing the home, and housing standards. The occupation section describes the transactive process created with the use of the home modification guide, in regards to the person, environment, and occupation factors. The last section, the resource section, includes additional information regarding the home modification process. The full product is present in its entirety in the Appendix.

CHAPTER V

SUMMARY

Purpose

The purpose of the product was to provide a tool for occupational therapists working with individuals who have sustained an SCI in an inpatient rehabilitation center with a home modification guide that facilitates meaningful engagement of occupations within the home. The guide promotes accurate, safe, and holistic recommendations and resources by incorporating client centered feedback and preferences. To create the guide, the occupational therapy model of Person Environment Occupation (PEO) was used in order to encompass every aspect of the individual. Thus, the guide was sectioned into four parts: person, environment, occupation, and an additional resource section.

The "person" section contains a three page set of interview questions aimed to gather subjective data on the individual's needs, roles, interest, habits, abilities, and values related to the home. The authors formulated the questions based off of concepts related to PEO, and personal interest as to what they believed would capture a comprehensive portrayal of the individual being interviewed. The "environment" section includes two forms created by the authors focusing on contractor communication and a follow up form to identify if any additional changes need to be made in the home modification process. Additionally, various resources pertaining to assistive technology, aesthetic design, funding, and laws and regulations are included in the section. The

"occupation" section is comprised of a one page description of the transactions that occurred throughout the guide related to the PEO model. Finally, the "resources" section provides information related to the home modification process, such as websites, research, and personal experiences from individuals who have had home modifications. The authors believe that by examining the home modification process through this model, the therapist using the guide will be encouraged to address all areas of the individual, thus strengthening their ability to provide holistic recommendations.

Limitations

While the resource guide for home modifications is a much needed and applicable tool, it does have limitations and areas for improvement. The resource guide has not been utilized for direct client care, which limits the author's knowledge of its efficacy. Additionally, as the guide has not been implemented within a hospital or clinic setting, the practicality factors, such as time requirements and ease of use, have not been established. The resource guide is not a comprehensive guide which means there are resources that were not included and topics that were not explored. Furthermore, as time passes, additional resources may become available that will not have been included at the time of the guide creation. Improvements to the product could include making changes based on information received through the feedback of individuals with an SCI who have experienced the home modification process and through the feedback from occupational therapists who are implementing it. Finally, improvements could be made based on the implementation of outcome measures and the results received.

Propositions

The intent of the resource guide is that it be implemented as part of the discharge process in hospitals and inpatient rehabilitation clinics by occupational therapists for individuals post-SCI. The occupational therapists will utilize the "person" section of the guide to guide the interview and inform the therapist's recommendations. Specific resources from the guide will be sent home with the client at the therapist's discretion based on relevance. In order to measure the product's usefulness, the authors will utilize the follow-up form included in the "environment" section of the guide, which will provide them with information regarding client satisfaction, occupational performance, and further areas of need. Additionally, the authors foresee the implementation of an outcome measure such as the Canadian Occupational Performance Measure to gather statistical data to support its use and effectiveness. Finally, feedback regarding the resource guide will be gathered and analyzed from clients, occupational therapists, and individuals with an SCI who have experienced the home modification process through semi-formal interviews.

Barriers to the implementation of the resource guide include the distribution of the guide to hospitals and rehabilitation facilities, the implementation of the guide into therapists' discharge planning processes, and a lack of time for utilization from the therapist's perspective. Strategies to increase the distribution of the guide nationally include the authors presenting at conferences, provide samples of the guide for free, encouraging word-of mouth between occupational therapists, and putting the guide description and reviews onto social media platforms. In order to encourage occupational therapists to utilize the guide, despite time constraints and set processes, the authors must

motivate managers to value its use and effectiveness. To do this, the authors will need to confirm the product's usefulness with research and outcome measures that demonstrate significant and positive changes.

Conclusions

The decreased length of hospital stays has led to a significant lack of services available after discharge from the hospital for individuals who have recently sustained an SCI (New, 2015; Silver et al., 2012). In order to return to a home rather than a skilled living facility, individuals post-SCI often require assistance with housing, medical equipment, and home modifications that support function (New, 2015; Silver et al., 2012). The Spinal Cord Injury Home Modification Resource Guide is a tool for occupational therapists to utilize as part of the discharge process in order to provide recommendations and resources that will facilitate successful transitions to home after an SCI. The guide aims to provide a holistic perspective that allows the client to advocate for themselves and for their personal wants and needs as they relate to the home environment. The clinical practice strengths of the product include: the ability to implement the guide at any stage of the hospitalization, the quick reference nature of the guide, and the ability to empower clients by providing reliable tools. While the authors recognize that the product has not been tested or proven effective, it is their hope that the product be utilized as a stepping stone for further research and development.

Recommendations

Due to the limitations identified, the authors have included recommendations of the product for future use. First, it is recommended the resource guide be implemented into clinical situations in order to receive feedback from therapists on ease of use. The

authors developed the guide with no advice or information from someone who has experience providing recommendations for the home modification process. Second, it is recommended that outcome measures are incorporated in order to identify whether the guide improves overall quality of life and satisfaction of modifications made. Finally, it is recommended that further collaboration be made with an individual who has a spinal cord injury and has made modifications to their home. This would provide information on whether the guide would be beneficial in obtaining data on the meaning of the home. There is potential for further develop of the guide, including additional documents and resources added, a research study conducted with the use of the guide, and the potential to expand the use of the guide with other populations (i.e. geriatrics, cerebral palsy, etc.). With the implementation of the recommendations, the authors believe that the guide could be used in all settings of occupational therapy that provide home modification recommendations.

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APPENDIX

SUCCESSFUL TRANSITION TO HOME FOLLOWING A SPINAL CORD INJURY:

A RESOURCE GUIDE FOR HOME MODIFICATIONS

SUCCESSFUL TRANSITION TO HOME FOLLOWING A SPINAL CORD INJURY: A RESOURCE GUIDE FOR HOME MODIFICATIONS

Alison Ikeogu, MOTS & Kelsey Kanwischer, MOTS
Advisor: Suzanna Morrison, MSOT & OTR/L

"My favorite technology is technology that isn't designed for people with disabilities, but works anyway. It's a leveler without intending to be"
- Steve O'Hear

Table of Contents

Development of the Guide

In conjunction with information from the individual's medical record (i.e. DOB, diagnosis, insurance type, etc.), this guide is a method to gather information regarding meaning of the home in relation to individuals who have sustained a spinal cord injury. The occupational therapy model of Person Environment Occupation (PEO) is used to frame the guide as this model emphasizes the transactive process that occurs when analyzing occupational performance (Turpin & Iwama, 2011). The authors believe that by examining the home modification process through this model, it will in turn facilitate a holistic approach when analyzing the home as the therapist will be encouraged to address all areas of the individual being assessed. The individual's sense of who they are must not be overshadowed by a diagnosis, and it is important to the authors that the affected individual receives guidance that is meaningful, person centered, and focused on providing the greatest person-environment-occupation fit.

Objectives

- To establish a foundation of the individual's preferences regarding personalization of the home.
- To provide holistic recommendations in order to ease transition from a rehabilitation or hospital setting to home.
- To provide home modification tips and strategies to increase accessibility and function within the home.
- To assist in facilitating collaborative conversation with other members of the home modification team.
- To provide a means of gathering data in order to provide client centered recommendations.

How to Use the Guide

This guide is comprised of four main sections: Person, Environment, Occupation, and Resources:

- The “Person” section is a set of semi-structured interview questions for the occupational
  therapist to administer during a therapy session. The therapist is looking to gather information on the individual’s needs, roles, interests, habits, abilities, values, and any information regarding their personal experiences.

- The “Environment” section encompasses information, resources, and guidelines for the therapist to utilize in order to provide holistic recommendations when examining the environment from the individual's perspective. A follow up form has been created in order for the therapist to inquire how the home modification process is going, and whether changes in the process need to be made. Additionally, the authors felt as if it was important to have a method to increase communication between therapist and contractor, which is why a form has been created for that purpose. Finally, general information is provided regarding layout of the home, resources for individuals to use when in the process of designing the home, and housing standards.

- The “Occupation” section describes the transactive process created with the use of the home modification guide, in regards to the person, environment, and occupation factors.

- The “Resource” section includes additional information regarding the home modification process.

Person

Therapist Explanation: *This section is to gather information regarding yourself, including what you value, want, and need in order to maximize meaning of your remodeled home.*

Individual Perspective

1. How long have you lived in your home? _____
2. Do you plan on returning to your home once discharged? _____
    a. *If not, continue with the screening in order to maximize a holistic outlook for future homes.*
3. How many people, if any, will be living in your home? _____
4. Tell me what your home means to you?
    a. What specific aspects of your home do you find meaningful?
    b. Do you have concerns about maintaining meaning of your home?

_____
_____
_____
_____

5. Tell me about your daily routines in your home?
    a. Do you have concerns about returning to these routines upon discharge?
    b. What aspects of your home environment will need to be modified to facilitate participation in your daily routines?

_____
_____
_____
_____

6. What are your roles in the home? (i.e. parent, housekeeper, caretaker, etc.)?
    a. Are these roles meaningful to you? Why?
    b. Do you anticipate these roles changing?
    c. In order to participate in these roles, what aspects of the environment do you think should change?

_____
_____
_____
_____

7. What hobbies do you participate in within the home (i.e. scrapbooking, videogaming, cooking, reading, etc.)?
    a. Where do these hobbies take place within the home?
    b. What properties/materials do you need in order to participate in these hobbies (i.e. table, spacious room, bright lighting, etc.)?
    c. In order to participate in these hobbies, what aspects of the environment do you think should change?

_____
_____
_____
_____

8. How do you want your home to be utilized? (i.e. gathering space, place to raise a family, work space, place of relaxation, etc)?

_____
_____
_____
_____

9. Do you have family/social gatherings in your home?
    a. If no, skip to letter "f".
    b. If yes, do you consider these gatherings meaningful? Why?
    c. How often do you plan on hosting family gatherings?
    d. Which rooms do these gatherings take place?
    e. In order to participate in these gatherings, what aspects of the environment do you think should change?
    f. Upon completion of home modifications, do you plan on hosting more social/family gatherings as it will be more accessible for you?

_____
_____
_____
_____

10. What are the top three most important things you want to be able to do in your home?

_____
_____
_____
_____

11. What qualities do you value in a home? (i.e. comfort, accessibility)
    a. Is aesthetic design important to you?

_____
_____
_____
_____

12. If applicable, what qualities do other members of the home value? (i.e. comfort, accessibility)
    a. Is aesthetic design important to other members or the household

_____
_____
_____
_____

13. Do you value participation in cultural practices (i.e. celebrations, family traditions, spiritual activities, meditation)?
    a. If yes, describe cultural events, practices, or traditions that you wish to participate in upon discharge.
    b. Where do these practices take place within the home?
    c. What properties/materials do you need in order to participate in these practices (i.e. table, spacious room, bright lighting, etc.)?
    d. In order to participate, what aspects of the environment do you think should change?

_____
_____
_____
_____

Clinical Judgement

In this section, the therapist will describe his or her impression of the client/client factors during the individual perspective interview.

Examples*:* Posture, interest, attention, ability to communicate, ability to comprehend questions, presence of family or caregiver.

_____
_____
_____
_____
_____
_____
_____
_____

Environment

Assistive Technology

Smart Home Systems and Products

"My favorite technology is technology that isn't designed for people with disabilities, but works anyway. It's a leveler without intending to be."

-Steve O'Hear

- What does the term Smart Home mean?
  - A DIY Smart Home is a home that is, for the most part, controlled via a mobile device that connects to and controls devices (i.e. lamps, doorbells, appliances) through a wireless network or Wi-Fi.
  - A home automated system is a smart home that is installed via a company that will require a monthly subscription and often provides security systems along with smart devices custom made for your home.
- Companies that provide DIY smart home systems include: Apple, Samsung, Amazon, Google, Ecobee, Phillips Hue
- DIY smart home products cover a wide range of purposes and continue to evolve as technology improves. The following is a list of possibilities:
  - Thermostats that can be programmed to your specifications or can monitor your preferences and alter themselves based on those statistics
  - Wireless home security cameras that are easy to use and accessed via a mobile device
  - Baby monitors
  - Lighting systems that allow the user to turn lights on or off via a mobile device while also monitoring lighting use and if desired automate lighting based on family or user preferences (i.e. lights on in bedroom at 6:30 am)
  - Smart plugs that fit into your electrical outlet and are used remotely to turn on and off any device/appliance plugged in
  - Smart locks that allow you to unlock and lock doors from a wireless device
  - Smart appliances (refrigerators, ovens, stove tops, washing machines, etc).
  - Smart smoke and carbon monoxide detectors
  - Garage door opener systems
  - Smart beds that track heart rate, breathing and movement, and uses its SleepIQ app to provide suggestions about bed times and bed firmness via an app for tablets and phones.
  - Smart TVs
  - Blind/curtain control
  - Home kits are a recent addition to the DIY smart home world and are intended to offer a central control point to control all smart home devices through voice control and automated actions (i.e. a set of actions commonly performed by the user)

- Amazon's Alexa
- Google Home
- Apple HomeKit

For further information regarding DIY smart home products and systems

Visit: http://www.tomsguide.com and explore *A Guide to Smart Homes* and *Best Smart Home Gadgets of 2017*

For further information regarding home automated systems

Visit: http://www.topconsumerreviews.com/home-automation/ and explore the top rated companies with an overview of services provided

Grab Bar Installation

It is recommended that all grab bars are installed by a skilled contractor with the advice of a physical or occupational therapist to determine appropriate and functional placement and angle.

If this is not feasible, the following resources will assist you and your family with safe DIY installation.

The link below provides a video example of how to properly install a grab bar in a shower

https://www.youtube.com/watch?v=HYt4UigHv0w

The link below provides detailed information regarding where and how to install grab bars in a bathroom

https://www.lowes.com/cd_Grab+Bar+Essentials_1272566813_

The link below provides detailed information regarding where and how to install grab bars in a bathroom.
https://www.lowes.com/cd_Grab+Bar+Essentials_1272566813_

*See also, the "Consumer's Guide to Home Adaptation", which is located in the "Resource" section and has information related to grab bar installation.

Aesthetics and Home Design

The link below provides a wide variety of accessible home products that will allow individuals to choose products that fit best within their home design and are aesthetically pleasing.

https://www.lowes.com/c/Accessible-home

The link below outlines the wide variety of grab bar options available to choose from that are aesthetically pleasing and that will match with the décor or style of you home.

https://www.moen.com/search/product-gallery?search_terms=grab+bars

The links below provide suggestions on how to make your home happier.

http://www.housebeautiful.com/room-decorating/colors/tips/g10/happy-rooms-cheery-homes-1011/?slide=9

http://www.apartmenttherapy.com/10-things-that-will-make-you-happier-at-home-174151

*Visit sites such as Pinterest for inspiration to cultivate an aesthetically pleasing home designed for accessibility and for you.

Laws and Regulations

ADA Standards

The 2010 ADA Standards for Accessible Design are the most recent standards released by the ADA and can be accessed by following the link below:
https://www.ada.gov/regs2010/2010ADAStandards/2010ADAstandards.htm

What you will find in the resource listed above:

- Requirements for housing at a place of education (i.e. Universities or colleges)
- Social Service Center housing requirements (i.e. group homes, halfway houses, shelters)
- Long Term Care housing requirements
- Correctional Facility housing requirements

For information about the ADA, including the revised 2010 ADA or for answers to specific questions, call the toll-free ADA Information Line at 800-514-0301 (Voice) or 800-514-0383 (TTY).

Fair Housing Act

Information regarding the Fair Housing Act can be located by following the link below: https://portal.hud.gov/hudportal/HUD?src=/program_offices/fair_housing_equal_opp/FHLaws/yourrights

Relevant Information for Individuals with an SCI

- Description of the Fair Housing Act which details the rights of individuals with disabilities with regards to housing opportunities and home modifications for renters.

- Description of the process for filing a complaint via the Housing Discrimination Complaint Form if you believe your rights have been violated

- Description of the process after the complaint has been filed.

- Answers to frequently asked questions on the housing rights of people with disabilities and the responsibilities of housing providers and building and design professionals under federal law.

  https://portal.hud.gov/hudportal/HUD?src=/topics/information_for_disabled_persons

- US Department of Housing and Urban Development laws, regulations, assistance, and toll-free numbers to call by state.

Funding

Funding Resources for Home Modifications and Housing

- The link below provides a list of programs that provide financial assistance to people with disabilities to make their homes accessible:
  http://pvamag.com/pn/magazine/article.php?art=591

- The link below provides access to the Digital Federal Credit Union where you can apply for an access loan. Per the website:
  - Access Loans are for any product, device, or building modification designed to assist someone with a disability. The borrower need not be the beneficiary of the purchase. Qualified purchases include, but are not limited to: DME, rehab equipment, manual transportation, adaptive computer and communication systems, and accessible building modifications.

  https://www.dcu.org/loans/access.html

  Link provided on United Spinal Association Resource Center page as well
  http://www.spinalcord.org/resource-center/askus/index.php?pg=kb.page&id=88

- The link below provides an extensive list of home modification funding options and is organized by federal, state, and private funding sources
  http://www.spinalcord.org/resource-center/askus/index.php?pg=kb.page&id=1693

- The link below details rent assistance possibilities if you are living in the public housing domain
  https://portal.hud.gov/hudportal/HUD?src=/topics/rental_assistance

- The link below provides information regarding federal loan programs and community based programs for home improvements
  https://portal.hud.gov/hudportal/HUD?src=/topics/home_improvements

SCI Home Modification Resource Guide - Follow Up Form

Description

The purpose of this form is to gather information regarding the individual's experience of the home after receiving modifications. Questions were developed in conjunction with the information presented in the "Person" section of the resource guide. Follow up may occur post 3 months, 6 months, 9 months, etc. of discharge, depending on the availability of the therapist. The therapist should send a copy of this form with the individual upon discharge, and the individual can mail or email the form back when applicable. The form for distribution can be found on the following page.

SCI Home Modification Resource Guide - Follow Up Form

Client Name: _____
Date Completed: _____

Directions
Please fill out the following form in order to provide us with an idea of how your home modification process is going. Be as detailed as you can. Please email or mail the form to the occupational therapy department when finished. If you need further assistance, please give us a call. Thank you.

1. How have you felt with the changes in your home?
   _____
   _____
   _____
   _____

2. Are you able to participate in the meaningful activities that you once completed?
   _____
   _____
   _____
   _____

3. Do you feel as if the team is valuing your opinion?
   a. If no, what specific areas are you referring to?
   b. If yes, how has that been facilitated (i.e. are they providing options, involving family members, including you in decision making).

   _____
   _____
   _____
   _____

4. How has the process been with obtaining aesthetically pleasing supplies?
   _____
   _____
   _____
   _____

5. Have you had any difficulty with securing financial resources?
    a. If no, what resources have you been using?
    b. If yes, how can I assist?

_____
_____
_____
_____

6. How can I further assist in making your home meaningful?

_____
_____
_____
_____

Contractor Communication

Description

The purpose of this form is to facilitate successful communication between the therapist and contractor when making recommendations for the home. Information is presented in a way that promotes the individual's perspective on what they identify as meaningful to them. The therapist should fill out after completing the "Person" section of the guide and distribute to the affected individual before discharge so that they are able to provide the information to the contractor. Question 1 (Individual Priorities) can be taken from information from question 4 in the "Person" section of the guide. Question 2 (High Priority Modifications) can be taken from questions 4 through 13 in the "Person" section of the guide. Question 3 (Aesthetic Design) can be taken from questions 11 and 12 in the "Person" section of the guide. The form to be filled out can be found on the following page.

**Additional information regarding contractor communication can be found in the "Consumer's Guide to Home Adaptation".

Contractor Communication Form

Directions
Use the information from this form to make modifications based on the priority areas that the individual identified.

1. Individual Priorities

_____
_____
_____
_____

2. High Priority Modifications

☐ Kitchen
☐ Dining room
☐ Living room
☐ Office
☐ Other
☐ Bathroom
☐ Bedroom
☐ Craft/Study room
☐ Gaming room

_____
_____
_____
_____

3. Is aesthetic design a priority for the individual? – Y / N
    a. If yes, what aspects of designs? (i.e. appliances, wall color, light fixtures, etc.)

_____
_____
_____
_____

Occupation

Occupation and occupational performance were facilitated throughout the guide. The PEO model is a transactive process, thus, components from the "Person" and "Environment" sections provided opportunities to examine meaningful occupations to enhance occupational performance. This in turn assisted the authors in making the decision of using the "Occupation" section to highlight the transactions that occurred throughout the guide that enhanced occupational performance. Examples of transactions that occurred are presented below.

- Person → Occupation:
  - The effects of the person on occupation were highlighted frequently in the questions introduced in the "Person" section. Questions were developed with the intent of uncovering meaningful occupations that the individual performs. Additionally, the authors sought to identify how the person viewed their performed occupations, and whether they believed that their abilities would have an impact on how they performed those occupations in their home environment.
- Person → Environment:
  - Environment was a major factor analyzed for the guide, thus, there were many instances where the authors sought to identify how the environment would impact the person factors. Questions from the "Person" section were intended to uncover that, such as numbers 6, 7, and 11. The questions are worded with the intention of obtaining information on changes in the environment that need to be made in order to fulfill the person attributes (roles, hobbies, etc.). Additionally, the "Environment" section is intended to offer the person with opportunities to maximize their home environment by providing resources, forms, and general information about home modifications. This section contains a specific "follow up form" that will be used to obtain information regarding the individual's experience of the home modification process months after discharge from the hospital in order to ensure that the environment continues to support the individual's needs.
- Occupation → Environment:
  - Participation in meaningful occupations was the ultimate goal that the researchers sought to facilitate. The authors believe that by assisting in the creation of a home environment that is meaningful to the individual, participation in occupations will be sustained. This is demonstrated throughout the wording of the questions in the "Person" section, as well as many resources in the "Environment" section on assistive technology and facilitating factors that can enhance participation of occupations in the home environment.

Resources

Consumer's Guide to Home Adaptation

Description
This guide was developed in 2002 for the purpose of providing individuals a way to make decisions about their home modifications. It is intended to help make the home safer and more comfortable. The authors of this guide assert that it can be used as an interview tool by a contractor, designer, or social worker, providing a means for transfer of information from one professional discipline to another. The guide goes through each room of the house, and asks questions regarding what the individual has or does not have in the home (i.e. is the lighting adequate in the bedroom, are the door locks sturdy, etc.). At the end of the guide, there is a "planning checklist" that asks the individual to list preferences of things they would like to change in the home, going through each room of the home. Additionally, there are tips and strategies regarding how to obtain a contractor, what to look for, and how to communicate with the contractor. This guide encompasses many aspects of the physical traits of the home, and provides opportunities to prioritize modifications made.

A copy of the guide could not be included for copyright reasons, however further information and an opportunity to purchase the guide can be located at the following site:

http://www.homemods.org/resources/pages/conguide.shtml

Adapting a Home for Wheelchair Accessibility

Created by: Kimberly Eberhardt Muir , MS, OTR/L,

Former Program Specialist

Rehabilitation Institute of Chicago

Locate the publication by following the link below:

https://lifecenter.ric.org/index.php?tray=content&cid=2246

Information included

- Strategies for modifying your home
- Wheelchair accessible standards for a home
  - Entrances and Exits
  - Interior/General Living Space

United Spinal Association

The United Spinal Association Resource Center can be located by going to the following website using the link provided below.

http://www.spinalcord.org/resource-center/askus/index.php?pg=kb.book&id=3

Resources included are as follows

- How to pay for home modifications
- Accessible home design
- Housing modification resources
- Companies that do home modifications

Our favorite resources

- United Spinal Association's affiliate service providers: a directory for reliable service providers near you that specialize in SCI care, products, and services
  - http://providers.spinalcord.org/
- A guide to selecting a wheelchair ramp
  - http://www.newdisability.com/wheelchairramp.htm
- SCI Video Blog: a collection of tutorial videos posted by SCI individuals of all different levels of injury to visually demonstrate how they perform their daily life activities. The website allows individuals with new spinal cord injuries to search for videos based on their level of injury, ASIA level, completeness of the injury, and SCI complications, among other things.
  - http://www.scivideoblog.com/#most-popular

Other services provided:

- Free membership
- Access to knowledge books which cover a wide variety of topics related to SCI related to the following topics: ADA, attorneys, custody, home care, legal, medical records, Medicare, patient rights, scholarships, and spasticity.
- Educational webinars
- Information regarding local United Spinal Association chapters
- Web engine to locate support groups in your area
- Online counseling services and chat room avenues
- Free publications

Consumer Blog

The following link will take you to a blog by a gentleman who designed and oversaw the construction of his wheelchair accessible home. The blog is an excellent source of insider information and tips that we hope will be helpful for clients when beginning the home modification process.
http://web.ics.purdue.edu/~bsd/building.html

Research

Ding, D., Cooper, R. A., Paul, P. F., Lavinia, F. P. (2011). Sensor technology for smart homes. *Maturitas, 69,* p. 131-36. doi: 10.1016/j.maturitas.2011.03.016

Purpose
To review sensor technologies used in smart homes, discuss the strengths and limitations of different type of sensors, and offer suggestions for future directions. A sensory technology processes and makes deductions from the acquired data on the state of the home as well as the activities and behaviors of its residents.

Discussion/Conclusion
"As the population of people with disabilities grows and the burgeoning older adult population seeks to age in place, smart home technologies can potentially provide an answer to relieve the demanding workload of care from family caregivers and healthcare providers, and support independent living. It is important that sensor technologies for smart homes address actual needs of all stakeholders including end users, their family members and caregivers, and their doctors and therapists".

Dewsbury, G., & Linskell, J. (2011). Smart home technology for safety and functional independence: The UK experience. *Neurorehabilitation, 28,* p. 249 260. doi: 10.3233/NRE20110653

Purpose
To explore the underlying issues of the complexity of the smart home design process when designing for people with neurological conditions.

Discussion/Conclusion
"The paper demonstrates that the diversity of neurological conditions means that the design of a smart home or smart space cannot be guessed at but has to precisely meet the needs and wishes of the person who will be using the technologies".

Aplin, T., Jonge, D., & Gustafsson, L. (2013). Understanding the dimensions of home that impact on home modification decision making. *Australian Occupational Therapy Journal, 60,* 101-109. doi: 10.1111/1440-1630.12022

Purpose
To try to determine what aspects of the home environment impact home modification decision making.

Discussion/Conclusion
The researchers found similar results to past studies in that the physical, social, personal, temporal, and occupational factors in home design impact the individual's perspective with the modification process.

Pettersson, C., Lofqvist, C., & Fange, A. M. (2012). Client's experiences of housing adaptations: a longitudinal mixed-methods study. *Disability & Rehabilitation, 34*(20), 1706-1715. doi: 10.3109/09638288.2012.660596

Purpose
To explore clients' experience of home modifications over time in relation to housing and health.

Discussion/Conclusion
Home modifications were consistently considered to be valuable and important, for being able to participate in desirable activities, even if the modification was not always apprehended as optimal. Home modifications are valuable interventions, and enhance activity and independence in spite of the fact, that clients experience functional decline over time.